

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (amended) A microfluidic reactor comprising:
a plurality of ~~flow-through~~ reaction cells, ~~each reaction cell comprising:~~
 - i. ~~at least one illumination chamber, and~~
 - ii. ~~at least one reaction chamber,~~~~wherein the illumination chamber and the reaction chamber are in flow-~~
~~communication and are spatially separated in the reaction cell; and a plurality of~~
tapered fluid channels, wherein each of said tapered fluid channels is in fluid
communication with a plurality of said reaction cells.
2. (amended) A microfluidic reactor according to claim 1, wherein the reactor comprises ~~at~~
~~least~~ between 10 and 10,000 reaction cells.
3. (amended) A microfluidic reactor according to claim 1 ~~2~~, wherein the reactor comprises
~~at least~~ between 100 and 10,000 reaction cells.
4. (amended) A microfluidic reactor according to claim 1 ~~3~~, wherein the reactor comprises
~~at least~~ between 100 and 1,000 reaction cells.
5. (amended) A microfluidic reactor according to claim 1, wherein the reactor comprises ~~at~~
~~least~~ between 1,000 and 10,000 reaction cells.
6. (canceled)
7. (canceled).
8. (original) A microfluidic reactor according to claim 1, wherein the reactor comprises a
silicon microfluidic template.

9. (original) A microfluidic reactor according to claim 1, wherein the reactor comprises a plastic microfluidic template.
10. (original) A microfluidic reactor according to claim 1, wherein a distance between reaction cells which are adjacent to each other is 10 to 5,000 microns.
11. (original) A microfluidic reactor according to claim 1, wherein a distance between reaction cells which are adjacent to each other is 10 to 2,000 microns.
12. (original) A microfluidic reactor according to claim 1, wherein a distance between reaction cells which are adjacent to each other is 10 to 500 microns.
13. (original) A microfluidic reactor according to claim 1, wherein a distance between reaction cells which are adjacent to each other is 10 to 200 microns.
14. (canceled)
15. (original) A microfluidic reactor according to claim 1, wherein the reactor comprises a microfluidic template and at least one window plate.
16. (original) A microfluidic reactor according to claim 1, wherein the reactor further comprises at least one shadow mask.
17. (canceled)
18. (amended) A microfluidic reactor according to claim 1, wherein the reactor further comprises an inlet channel ~~and an inlet restriction gap connected to the illumination chamber,~~ and an outlet channel ~~and an outlet restriction gap connected to the reaction chamber.~~
19. (canceled)

20. (original) A microfluidic reactor according to claim 1, wherein the reactor further comprises one common inlet channel, branch inlet channels, branch outlet channels, and one common outlet channel.
21. (amended) A microfluidic reactor according to claim 1, wherein the reactor further comprises immobilized molecules in the reaction ~~chamber~~ cells.
22. (original) A microfluidic reactor according to claim 21, wherein the immobilized molecules are biopolymers.
23. (original) A microfluidic reactor according to claim 21, wherein the immobilized molecules are immobilized with the use of linker molecules.
24. (original) A microfluidic reactor according to claim 21, wherein the immobilized molecules are selected from the group consisting of DNA, RNA, DNA oligonucleotides, RNA oligonucleotides, peptides, oligosaccharides, and phospholipids.
25. (original) A microfluidic reactor according to claim 21, wherein the immobilized molecules are oligonucleotides.
26. (canceled)
27. (amended) A microfluidic reactor according to claim 1, wherein the reactor further comprises immobilized molecules in a double-layer configuration in the reaction ~~chamber~~ cells.
28. (amended) A microfluidic reactor according to claim 1, wherein the reactor further comprises a three-dimensional attachment of immobilized molecules in the reaction ~~chamber~~ cells.
29. (amended) A microfluidic reactor according to claim 1, further comprising porous films in the reaction ~~chamber~~ cells.

30. (original) A microfluidic reactor according to claim 29, wherein the porous films are porous glass films or porous polymer films.
- 31-33. (canceled)
34. (canceled)
35. (amended) A microfluidic reactor according to claim ~~34~~ 1, wherein the fluid channels have a first cross sectional area, the reaction cells have a second cross sectional area which is smaller than the first cross sectional area, and the ratio between the first and second cross sectional areas is from 1:10 to 1:1000.
- 36-37. (canceled)
38. (canceled)
39. (amended) A microfluidic reactor according to claim ~~38~~ 1, wherein the tapered fluid channels provide uniform flow rates across reaction cells along ~~the a fluid channels~~ channel.
40. (amended) A microfluidic reactor according to claim 1, wherein the reaction ~~chambers~~ channels contain beads.
41. (amended) A microfluidic reactor according to claim 1, wherein the reaction ~~chambers~~ channels contain resin pads.
42. (amended) A microfluidic reactor according to claim 1, wherein the reactor comprises ~~an array of oligonucleotides in the reaction chamber~~, a microfluidic template ~~made of~~ silicon, and ~~a first and second window plates~~ plate ~~made of glass and~~ attached to the template.
43. (amended) A microfluidic reactor according to claim ~~1~~ 42, wherein the ~~device reactor~~ further comprises ~~an array of oligonucleotides in the reaction chambers~~ cells, ~~a~~

~~microfluidic template made of silicon, at least one window plate, a shadow mask, inlet channels and inlet restriction gaps connected to the illumination chambers, outlet channels and outlet restriction gaps connected to the reaction chambers, distribution channels for parallel reactions in the reaction cells, and connection channels to connect illumination chambers and reaction chambers.~~

44-47. (canceled)

48. (original) A chip comprising a plurality of microfluidic reactors according to claim 1.

49-99 (canceled)

100. (amended) A microfluidic reactor comprising at least one microfluidic template and at least one window plate attached to the template, the microfluidic template and the window plate defining a plurality of reaction cells ~~which provide for flow of liquid solution through the cells, each reaction cell comprising a first chamber in fluid communication with but spatially separated from a second chamber, the first chamber being adapted to be an illumination chamber, and the second chamber being adapted to be a reaction chamber~~ and a plurality of tapered fluid channels, wherein each fluid channel is in fluid communication with a plurality of said reaction cells.

101-105. (canceled).

106. (amended) A microfluidic reactor according to claim 100, wherein the ~~second chambers comprise~~ reactor further comprises immobilized molecules in the reaction cells at least one surface having immobilized molecules thereon.

107-163 (canceled).

164. (new) The microfluidic reactor according to claim 106, wherein said immobilized molecules are biopolymers.

165. (new) The microfluidic reactor according to claim 106, wherein said immobilized molecules are immobilized with the use of linker molecules.
166. (new) The microfluidic reactor according to claim 106, wherein said immobilized molecules are selected from the group consisting of DNA, RNA, DNA oligonucleotides, RNA oligonucleotides, peptides, oligosaccharides and phospholipids.
167. (new) The microfluidic reactor according to claim 106, wherein said immobilized molecules are oligonucleotides.
168. (new) A chip comprising a plurality of microfluidic reactors according to claim 100.